Artham
Resource Material

For Revised Syllabus Session 2024-25

NCERT Solutions

CHEMISTRY

Chapter 4 : Structure of The Atom

Class
9

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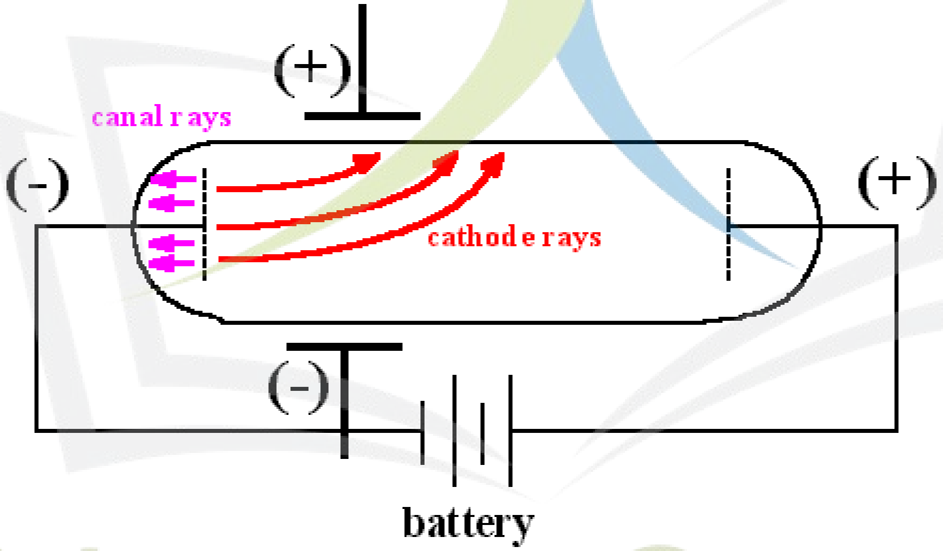
Chapter 4
Structure of the Atom

Questions:

Q. 1 What are canal rays?

Ans:

- The positively charged radiations produced in the discharged tube at low pressure and high voltage are called as canal rays.
- It was noticed by German scientist ‘ Eugen Goldstein’.



Q.2 If an atom contains one electron and one proton, will it carry any charge or not?

Ans: One proton has one unit positive. Similarly, one electron has one unit negative charge. An atom with one proton and one electron will be electrically neutral. The charges will be balanced inside an atom.

Questions:

Q. 1 On the basis of Thomson's model of an atom, explain how the atom is neutral as whole.

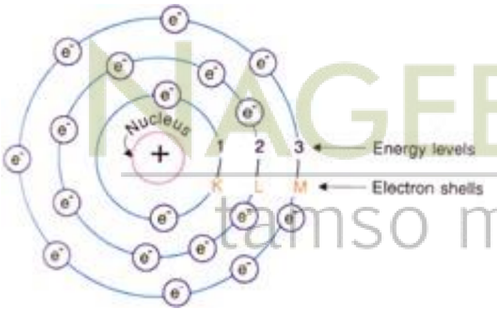
Ans: On the basis of Thomson's model of an atom, an atom consists of a positively charged sphere. The electrons are embedded in the sphere. The negative and the positive charges are equal in magnitude. Hence, the atom is electrically neutral.

Q.2 On the basis of Rutherford's model of an atom, which subatomic particle is present in the nucleus of an atom?

Ans: According to the Rutherford's model of an atom, there is a positively charged center called nucleus. The subatomic particles called protons are embedded in the nucleus. Almost all the mass of an atom resides in the nucleus. The electrons revolve around the nucleus in well defined orbits.

Q.3 Draw a sketch of Bohr's model of an atom with three shells.

Ans: A sketch of Bohr's model of an atom with three electron shells is shown below:



According to Bohr's model of an atom:

(i) Only certain special orbits known as discrete orbits of electrons, are allowed inside the atom.

(ii) While revolving in discrete orbits the electrons do not radiate energy.

These orbits are called energy levels. Energy levels in an atom are shown by circles.

These orbits are represented by the letters K,L,M,N,… or the numbers, n=1,2,3,4,….

Further, the distribution of electrons into different orbits of an atom was suggested by Bohr and Bury. The following rules are the rules followed for writing the number of electrons in different energy levels or shells: (i) The maximum number of electrons present in a shell is given by the formula $2n^2$, where ‘n’ is the orbit number or energy level index, 1,2,3,…. Hence the maximum number of electrons in different shells can be written as : first orbit or K-shell will be = 2 × 12 = 2, second orbit or L-shell will be = 2 × 22 = 8, third orbit or M-shell will be = 2 × 32 = 18, fourth orbit or N-shell will be = 2 × 42= 32, and so on. The maximum number of electrons that can be accommodated in the outermost orbit is 8. Electrons are not accommodated in a given shell, unless the inner shells are filled. That is, the shells are filled in a stepwise manner.

Q. 4 What do you think would be the observation if the a-particle scattering experiment is carried out using a foil of a metal other than gold?

Ans: On using any other metal other than gold would not have affected the observations of the experiment. Since, the structure of an atom is same for all states of atom. All other metals are not as ductile as gold, so a thin foil would have been difficult to obtain. If a thick foil is used in this experiment, then more alpha particles would have bounced back. As a result, no idea about the location of nucleus and the presence of empty space in an atom would be available with such a certainty.

Questions:

Q. 1 Name the three subatomic particles of an atom.

Ans.: Electron: It is negatively charged with one unit negative. The mass of an electron is considered to be negligible.

Proton: Proton has a charge, equal in magnitude but opposite in sign to that of the electron. Its mass is considered to be approximately 2000 times as that of the electron.

Neutron: Neutrons are present in the nucleus of all atoms, except hydrogen. It is subatomic particle which had no charge and a mass nearly equal to that of a proton.

Q. 2 Helium atom has an atomic mass of 4u and two protons in its nucleus. How many neutrons does it have?

Ans: We know that atomic mass is numerically equal to mass number of an atom. Since the helium atom has an atomic mass of 4u, therefore, the mass number of helium atom will be 4. And the number of protons in the helium nucleus has been given to be 2. Now,

Mass number = No. of protons + No. of neutrons

4 = 2 + No. of neutrons

And, No. of neutrons = 4 – 2 = 2

Thus, the helium has 2 neutrons.

Questions:

Q.1 Write the distribution of electrons in carbon and sodium atoms.

Ans: (i) The atomic number of carbon is 6. It means carbon has 6 protons and 6 electrons. Out of these 6 electrons, 2 electrons will occupy the first electron shell which is K shell and the remaining 4 electrons will occupy the second electron shell which is L shell. So, the electron distribution in a carbon atom will be:

K L

2, 4

(ii) The atomic number of sodium is 11. It means sodium atom has 11 protons and 11 electrons in it. Out of these 11 electrons, the first 2 electrons will go to K shell, the next 8 electrons will go to L shell and the remaining 1 electron will go to M shell. So, the electron distribution in a sodium atom will be:

K L M

8, 1

Q. 2 If K and L shells of an atom are full, then what be the total number of electrons in the atom?

Ans: K shell becomes full with 2 electrons and L shell becomes full with 8 electrons. So, if the K and L shells of an atom are full, then it will have a total of 2 + 8 = 10 electrons in it.

Questions:

Q.1 How will you find the valency of chlorine, sulphur and magnesium?

Ans: The number of electrons gained, lost or shared so as to make the octet of electrons in the outermost shell, gives the combining capacity of the element which is called the valency of an atom.

(i) Valency of chlorine: The Atomic number of chlorine atom is 17. This means it has 17 protons and 17 electrons.

K shell -2, L shell -8 and M shell-7.

A chlorine atom can accept 1 more electron to achieve configuration of 8 valence electrons. The valency of chlorine is 1.

(ii) Valency of sulphur: The atomic number of sulphur is 16. The sulphur atom has 16 protons and 16 electrons.Its electron configuration is K shell-2, L shell- 8 and M shell- 6.

A sulphur atom can accept 2 more electrons to achieve configuration of eight valence electrons. The valency of sulphur is 2.

(iii) Valency of magnesium: The atomic number of magnesium is 12. The means it has 12 protons and 12 electrons.

Its electron configuration is K shell-2, L shell-8 and M shell- 2 .

A magnesium atom can lose 2 outermost electrons to achieve configuration of 8 valence electrons, The valency of magnesium is 2.

Questions:

Q.1 If the number of electrons in an atom is 8 and the number of protons is also 8, then (i) what is the atomic number of the atom? And (ii) what is the charge on the atom?

Ans: (a) Atomic number is equal to the number of protons in one atom. Since this atom contains 8 orotons, so the atomic is 8.

b) This atom contains an equal number of positively charged and negatively charged electrons (8 each), so it has no overall charge. That is, the charge on this atom is 0 (zero).

Q.2 With the help of Tab. Is given below, find out the mass numbers of oxygen and sulphur atoms:

Name of Element	Symbol	Atomic Number	No. of Protons	No. of Neutrons	No. of Electron
Oxygen	O	8	8	8	8
Sulphur	S	16	16	16	16

Ans.: The mass number is defined as the sum of the total number of protons and neutrons present in the nucleus of an atom.

(i) Mass number of oxygen

= No. of protons + No. of neutrons = 8 + 8 = 16

Mass number of Oxygen is 16.

(ii) Mass number of sulphur

= No. of protons + No. of neutrons = 16 + 16 = 32

Mass number of sulphur is 32

Questions:

Q. 1 For the symbols H, D and T, tabulate three subatomic particles found in each of them.

Ans: Hydrogen has three isotopes, protium (H^1_1), deuterium (H^2_1or D^2_1) and tritium (H^3_1or T^3_1). The chemical properties of isotopes are similar but their physical properties are different. They have same atomic number but different mass numbers.

The three subatomic particles, electrons, protons and neutrons, in the three isotopes of hydrogen are given in the following table:

Isotope	Symbol	Mass number	Atomic number	Number of protons	Number of electrons	Number of neutrons
Hydrogen	H	1	1	1	1	0
Deuterium	D	2	1	1	1	1
Tritium	T	3	1	1	1	2

Q.2 Write the electronic configuration of any one pair of isotopes and isobars.

Ans: (a) A pair of isotopes of chlorine is $^{35}_{17}Cl$ and $^{37}_{17}Cl$. The atomic number of both the isotopes is the same 17. So, the electronic configuration of both these isotopes will be 2, 8, 7.

(b) A pair of isobars is $^{40}_{18}Ar$ and $^{40}_{20}Ca$. The atomic number of orgon (Ar) is 18, so its electronic configuration will be 2, 8, 8. The atomic of calcius (Ca) is 20, so its electronic configuration will be 2, 8, 8, 2.

Exercise:

Questions:

Q. 1 Compare the properties of electrons, protons and neutrons.

Ans: Comparison between proton, Neutron and Electron

Subtomic particle	Relative mass	Relative charge	Location in the atom
Proton	1u	+1	in the nucleus
Neutron	1u	0	In the nucleus
Electron	1/1840u	-1	Outside nucleuus

Q. 2 What are the limitations of J.J. Thomson's model of the atom?

Ans:

1. J.J. Thomson's model of the atom could not explain the results of alpha particle scattering experiment carried out by Rutherford.
2. It also failed to explain the deflections and rebounding of the alpha particles.3. It also failed to explain an atom's stability.
4. The theory did not mention anything about the nucleus of an atom.

Q.3 What are the limitations of Rutherford's model of the atom?

Ans: Limitations:

- The orbital revolution of the electron is not expected to be stable.
- According to Rutherford’s model, the electrons, while moving in their orbits, would give up energy.

Q.4 Describe Bohr’s model of the atom.

Ans: The present concept of atom was given by Neils Bohr. The bohr’s model of atom can be described as follows:

1) An atom is made up of three particles, called as electrons, protons and neutrons.

2) The protons and neutrons are located in a small nucleus at the centre of the atom.

3) The electrons revolve rapidly round the nucleus in fixed circular paths called energy levels or shells.

4) There is a limit to the number of electrons which each energy level (or shell) can hold.

5) Each energy level (or shell) is associated with a fixed amount of energy.

6) There is no change in the energy of electrons as long the keep revolving in the same energy level, and the atom remains stable.

Q.5 Compare all the proposed models of an atom given in this chapter.

Ans: A comparison between the models of an atom proposed by J.J. Thomson, Rutherford and Bohr is given below:

Model	Thomsens model of an atom	Rutherford's model of an atom	Bohr's model of an atom
Property	atom in which the atom consisted of a positively charged sphere. The electrons are embedded in the sphere. The negative and the positive charges are equal in magnitude. Hence, the atom is electrically neutral.	Rutherford put forward the model of an atom which had a positively charged center called nucleus. It also had the electrons which revolved around the	i) Only certain special orbits known as discrete orbits of electrons, are allowed inside the atom .(ii) While revolving in discrete orbits the electrons do not radiate energy. (ili)The

		nucleus in well defined orbits.	maximum number of electrons present in a shell is given by the formula 2n2 (iv)The maximum number of electrons that can be accommodated in the outermost orbit is 8.
Limitations	J.J. Thomson's model of the atom could not explain the results of alpha particle scattering experiment carried out by Rutherford	he orbital revolution of the electron is not expected to be stable. Any particle which is in a circular orbit would undergo an acceleration. Charged particles would radiate energy during acceleration. Electrons are negatively charged. Thus, the revolving	(i) Heisenberg principle - Position and momentum of a particle cannot be determined at same time, accurately. Result of both of them is greater than h/4n. (ii) In Bohr's theory, orbits were circular but now we know that they are 3-D and not 2-D.

		electron would lose energy. It will finally fall into the nucleus. If this was the situation, then the atom should be highly unstable. Hence, matter would not exist in the form that we know.	

Q.6 Summarise the rules for writing of distribution of electrons in various shells for the first eighteen elements.

Ans:

(1) The maximum possible number of electrons which can be found in any level of the atom of an element is given by $2n^2$ (where n is the number of that energy level). By using this relation, we will find that :

(a) the maximum possible number of electrons which can be accommodated in 1st energy level K shell, where n= 1,

$2n^2 = 2 \times (1)^2 = 2 \times 1 = 2$. Hence, K shell can have a maximum of 2 electrons.

(b) the maximum possible number of electrons which can be found in 2nd energy level, L shell, where n = 2 , $2n^2 = 2 \times (2)^2 = 2 \times 4 = 8$. L shell can have a max 8 electrons.

(c) the maximum possible number of electrons which can be found in 3rd energy level M shell, where n = 3, $2n^2 = 2 \times (3)^2 = 2 \times 9 = 18$. M shell can have a max 18 electrons.

(d) the maximum possible number of electrons which can be found in 4th energy level N shell, where n = 4. $2n^2 = 2 \times (4)^2 = 2 \times 16 = 32$. N shell can have a max 32 electrons.

(2)The electrons in an atom can not occupy a newer shell unless all the inner shells filled with electrons. This means that first, all the electrons fill K shell, then L shell, then M shell, then N shell, and so on.

(3) The electron in the outer shell of the first 18 elements cannot be more than 8 electron in the outermost shell

Q. 7 Define valency by taking the examples of silicon and oxygen.

Ans: In order to achieve an octet in the outermost shell, atoms react. This is done by gaining, sharing or losing electrons. The number of electrons gained, lost or shared so as to make the octet of electrons in the outermost shell, gives the combining capacity of the element which is called the valency of an atom.

Valency of silicon: The atomic number of silicon is 14. It has 14 electrons in its atom. The electronic configuration of silicon atom will be K shell- 2, L shell- 8 and M shell- 4. Silicon has 4 electrons in its valence shell. Now, Silicon atom can neither lose 4 electrons nor gain 4 electrons to complete its the octet due to energy considerations. Hence, silicon atom will share its 4 electrons with the 4 electrons of atoms of other elements to complete its octet. Since one silicon atom will share 4 electrons to achieve inert gas electron arrangement, therefore, the valency of silicon is 4. Valency of oxygen: The atomic number of oxygen is 8. It has 8 electrons in its atom. The electronic configuration of oxygen atom will be

K shell- 2 and L shell- 6. Oxygen has 6 electrons in its outermost shell. Now, an oxygen atom having 6 outermost electrons can gain 2 electrons from some other atom to achieve the nearest noble gas configuration. Since one atom of oxygen can gain 2 electrons to complete its octet. Therefore, the valency of oxygen is 2.

Q. 8 Explain with examples (i) Atomic number (ii) Mass number (iii) Isotopes, and (iv) Isobars. Give any two uses of isotopes.

Ans: (i) Atomic number: The number of protons in an atom of an element is known as atomic number of that element. For example, one atom of sodium element has 11 protons in it, so the atomic number of sodium is 11. Similarly, one atom of carbon element has 6 protons in it, so the atomic number of carbon is 6.

(ii) Mass number: The total number of protons and neutrons present in one atom of an element is known as its mass number. For example, one atom of sodium element contains 11 protons and 12 neutrons. Hence, the mass number of sodium is 11 + 12 = 23. Similarly, a normal carbon atom has 6 protons and 6 neutrons, so the mass number of carbon is 6 + 6 = 12.

(iii) Isotopes: Atoms of same element with same atomic number but different mass number are called isotopes of that element. For example, Hydrogen has three isotopes, protium (H^1_1), deuterium (H^2_1 or D^2_1) and tritium (H^3_1 or T^3_1). Many elements consist of a mixture of isotopes. Each isotope of an element is a pure substance. The chemical properties of isotopes are similar but their physical properties are different.

(iv) Isobars: Atoms of different elements which have the same mass number but have different atomic numbers are called isobars. For example, calcium, atomic number-20 and argon, atomic number 18 are isobars. Both these elements have same mass number which is equal to 40. Therefore, the total number of nucleons is the same in both the elements.

Uses of Isotopes: Isotopes of some elements have special properties makes them useful in various fields. For example, (i) An isotope of uranium is used as a fuel in nuclear reactors. (ii) An isotope of cobalt is used in the treatment of cancer. (iii) An isotope of iodine is used in the treatment of goitre.

Q.9 Na+ has completely filled K and L shells. Explain.

Ans: A sodium ion Na+, has 10 electrons in it. Now, the maximum capacity of K shell is 2 electrons and that of L shell is 8 electrons. Taken together, the maximum capacity of K and L shells is 2 + 8 = 10 electrons. A sodium ion Na+ has completely filled K and L shells because its 10 electrons can completely fill up K and L shells.

Q.10 If bromine is available in the form of, say, two isotopes 7935Br (49.7%) 8135Br (5,3%) calculate the average atomic mass of bromine atom.

Ans: We know that upper digit in the symbol of an isotope represents its mass (which is the same as its mass number). Now

(i) The mass of ${}^{79}_{35}Br$ isotope is 79 u and its abundance is 49.7%.

(ii) The mass of ${}^{81}_{35}Br$ isotope is 81 u and its abundance is 50.3%.

So, Average atomic mass of bromine =

$$79 \times \frac{49.7}{100} + 81 \times \frac{50.3}{100}$$

$$= \frac{3926.3}{100} + \frac{4074.3}{100}$$

$$= 39.263 + 40.743$$

$$= 80.006$$

$$= 80u$$

Thus, the average atomic mass of bromine is 80 u.

Q.11 The average atomic mass of a sample of an element X is 16.2 u. What are the percentages of isotopes ${}^{16}_{8}X$ and ${}^{18}_{8}X$ in the sample.

Ans.:

In order to solve this problem, we will have to suppose that the percentage of one of the isotopes in the sample is x, so that the percentage of the other isotope in the sample will be (100-x). Now:

(i) The mass of ${}^{16}_{8}X$ isotope is 16u. Suppose its percentage in the sample is x%.

(ii) The mass of ${}^{18}_{8}X$isotope is 18 u. Its percentage in the sample will be (100-x)%.

So, Average atomic mass of X = $16 \times \frac{X}{100} + 18 \times \frac{(100-X)}{100}$

But the average atomic mass of X has been given to be 16.2 u. Therefore,

$$16.2 = 16 \times \frac{X}{100} + 18 \times \frac{(100-X)}{100}$$

$16.2 = \frac{16X+1800-18x}{100}$

$16.2 \times 100 = 1800 - 2x$

$2x = 1800-1620$

$2x = 180$

$x = \frac{180}{2}$

$X = 90$

Thus, the percentage of the ${}^{16}_{8}X$ isotope in the sample is 90%. The percentage of the isotope ${}^{18}_{8}X$ in the sample will be 100 – 90 = 10%.

Q.12 If Z = 3, what would be the valency of the element? Also name the element.

Ans: The symbol Z stands for the atomic number of an element. By saying that Z = 3, we mean that the atomic number of this element is 3. The electronic configuration of the element having atomic number 3 is K L. 2, 1 It has 1 electron in its outermost shell (L shell). So, one atom of this element can lose 1 electron to achieve the nearest inert gas electron arrangement of K (which is the same 2 as that of helium gas). Since one atom of this element loses 1 electron to achieve the inert gas electron configuration, therefore, its valency is 1. The element having atomic number 3 is lithium.

Q. 13 Composition of the nuclei of two atomic species X and Y is given as under:

X Y

Protons = 6 6

Neutrons = 6 8

Give the mass numbers of X and Y. What is the relation between the two species?

Ans.: We know that:

Mass number = No. of protons + No. of neutrons

So, Mass number of X = 6 + 6

= 12

Mass number of Y = 6 + 8

= 14

Thus, the mass number of X is 12 and that of Y is 14.

Q. 14 A For the following statements, write T for true and F for false:

J. J. Thomson proposed that the nucleus of an atom contains only nucleons.

Ans.: False.

J,J Thomson proposed the model of an atom in which the atom consisted of a positively charged sphere. The electrons are embedded in the sphere. The negative and the positive charges are equal in magnitude.

Q.14(B) For the following statements, write T for true and F for false:

A neutron is formed by an electron and a proton combining together. Therefore, it is neutral.

Ans.: False.

Neutrons are present in the nucleus of all atoms, except hydrogen. It is subatomic particle which had no charge and a mass nearly equal to that of a proton.

Q. 14C For the following statements, write T for true and F for false:

The mass of an electron is about 1/2000 times that of a proton.

Ans.: True.

Proton has a charge, equal in magnitude but opposite in sign to that of the electron. Its mass is considered to be approximately 2000 times as that of the electron.

Q. 14D For the following statements, write T for true and F for false:

An isotope of iodine is used for making tincture iodine, which is used as a medicine.

Ans.: False

An isotope of iodine is used in the treatment of goitre.

Q.15 Rutherford's alpha-particle scattering experiment was responsible for the discovery of:

(a) Atomic nucleus (b) Electron

(c) Proton (d) Neutron

Ans: (a) Atomic nucleus

According to the Rutherford’s model of an atom, there is a positively charged center called nucleus. Almost all the mass of an atom resides in the nucleus. The electrons revolve around the nucleus in well defined orbits which can be compared to the solar system.

Q. 16 Isotopes of an element have :

(a) the same physical properties

(c) different number of neutrons

(b) different chemical properties

(d) different atomic numbers

Ans: (c) different number of neutrons.

Atoms of same element with same atomic number but different mass number are called isotopes of that element. For example, Hydrogen has three isotopes, protium (H^{1}_{1}), deuterium (H^{2}_{1} or D^{2}_{1}) and tritium (H^{3}_{1} or T^{3}_{1}).

Q. 17 Number of valence electrons in Cl- ion are:

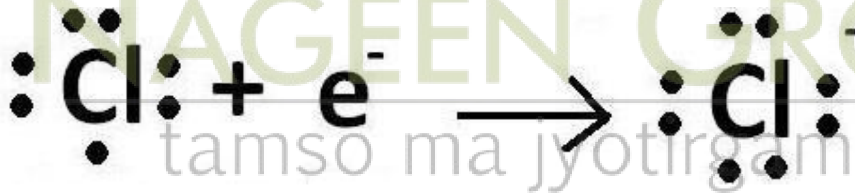
(a) 16

(b) 8

(c) 17

(d) 18

Ans:



Chlorine atom with 17 protons(+) and 17 electrons (-) Charge =0

Chloride ion with 17 protons (+) and 18 electrons (-) Charge = -1.

Q. 18 Which of the following is a correct electronic configuration of sodium?

(a) 2, 8 (b) 8, 2, 1

(c) 2, 1, 8 (d) 2, 8,1

Ans: (d) 2, 8, 1

Atomic number of sodium is 11. Its electronic configuration is K shell- 2, L shell- 8 and m shell- 1. It has 1 electron in its valence shell.

Q. 19 Complete the following table:

Atomic Number	Mass number	Number of neutrons	Number of protons	Number of electrons	Name of the atomic species
9	-	10	-	-	-
16	32	-	-	-	Sulphur
-	24	-	12	-	-
-	2	-	1	-	-
-	1	-	1	0	-

Ans.:

(a) First row:

(i) The given atomic number is 9. This shows that the number of protons is 9 and the number of electrons is also 9.

(ii) Mass number is equal to the sum of the number of protons and neutrons. Therefore, mass number = 9 + 10 = 19.

(iii) The atomic species having atomic number 9 is fluorine.

(b) Second row:

(i) The given atomic number is 16. This shows that the number of protons is 16 and the number of electrons is also 16.

(ii) The given mass number is 32. Number of neutrons can be calculated as , Mass number minus the number of protons. Therefore, the number of neutrons = 32 - 16 = 16

(c) Third row:

(i) The number of protons as 12. Hence,the atomic number is 12. The number of electrons is also equal to 12.

(ii) Number of neutrons can be calculated as, Mass number minus the number of protons. Therefore, the number of neutrons = 24-12 = 12.

(iii) The atomic species with atomic number 12 is magnesium.

(d) Fourth row:

(i) The number of protons is given as 1. Hence, the atomic number is 1 and the number of electrons is also equal to 1.

(ii) Number of neutrons can be calculated as, Mass number minus the number of protons. Therefore, the number of neutrons = 2-1=1.

(iii) The atomic species of atomic number 1 and mass number 2 is an isotope of hydrogen called deuterium $H^2{}_1$ or $D^2{}_1$.

(e) Fifth row

(i) The number of protons is given as 1. Hence,the atomic number is also 1.

(ii) The atomic species of atomic number 1 and mass number 1 is hydrogen or protium.

We can now write the completed Table as follows:

Atomic number	Mass number	Number of neutrons	Number of protons	Number of electrons	Name of the atomic species
9	19	10	9	9	Fluorine

16	32	16	16	16	Sulphur
12	24	12	12	12	Magnesium
1	2	1	1	1	Deutrium
1	1	0	1	0	Protium (hydrogen)

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1. Share your valuable resources with the group.
2. Help your fellow educators by answering their queries.
3. Watch and engage with shared videos in the group.
4. Distribute WhatsApp group resources among your students.
5. Encourage your colleagues to join these groups.

Additional notes:
1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.
   - No introductions.
   - No greetings or wish messages.
   - No personal chats or messages.
   - No spam. Or voice calls
   - Share and seek learning resources only.

Please only share and request learning resources. For assistance, contact the helpline via WhatsApp: +91-95208-77777.

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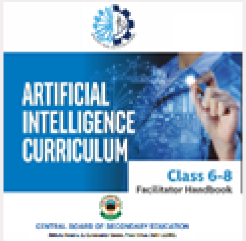
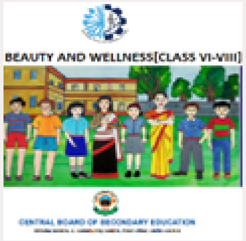

ARTIFICIAL INTELLIGENCE CURRICULUM
Class 6-8
Facilitator Handbook
CENTRAL BOARD OF SECONDARY EDUCATION

Artificial Intelligence


BEAUTY AND WELLNESS[CLASS VI-VIII]
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Beauty & Wellness

DESIGN THINKING&INNOVATION
CLASS VI-VIII
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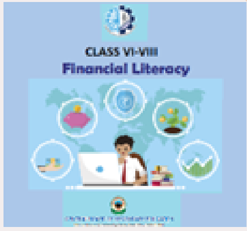
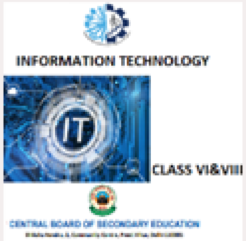
Design Thinking & Innovation



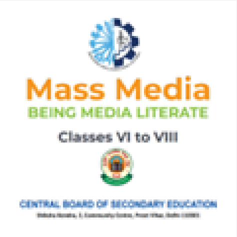
Financial Literacy

Handicrafts



Information Technology

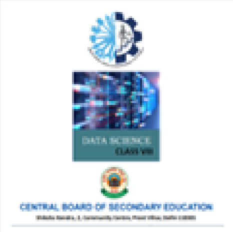
Marketing/Commercial Application



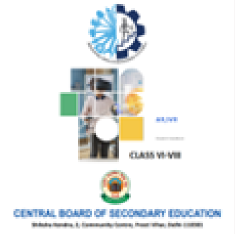
Mass Media - Being Media Literate

Travel & Tourism

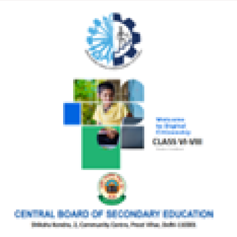
Coding



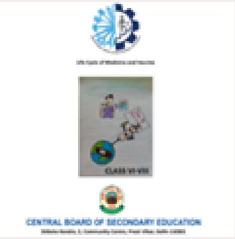
Data Science (Class VIII only)



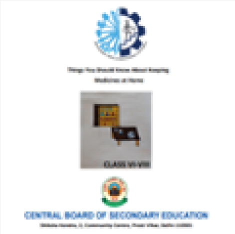
Augmented Reality / Virtual Reality



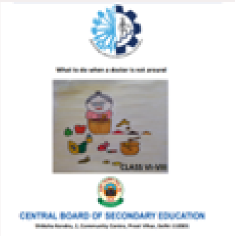
Digital Citizenship



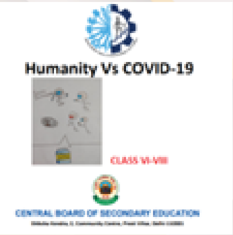
Life Cycle of Medicine & Vaccine



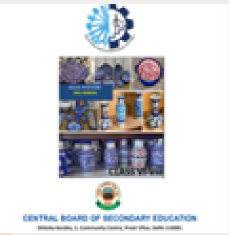
Things you should know about keeping Medicines at home



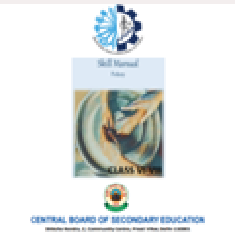
What to do when Doctor is not around



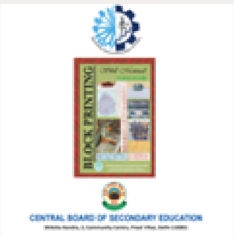
Humanity & Covid-19



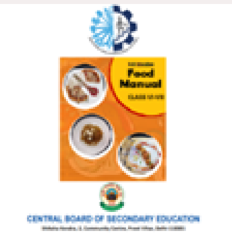
Blue Pottery



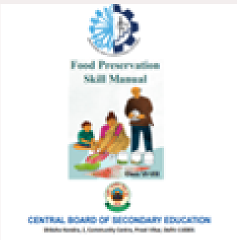
Pottery



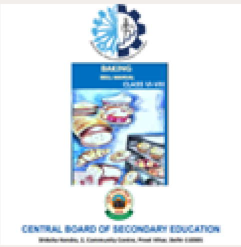
Block Printing



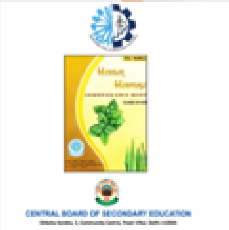
Food



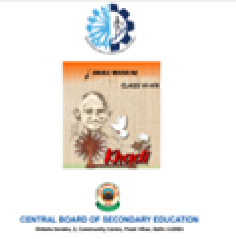
Food Preservation



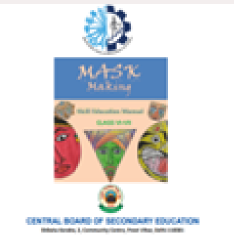
Baking



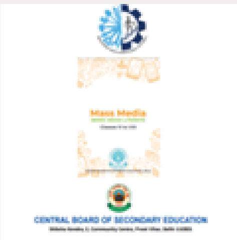
Herbal Heritage



Khadi

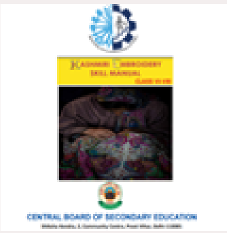


Mask Making



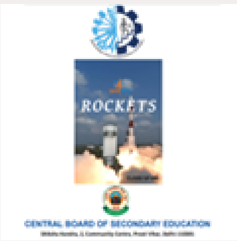
Mass Media

Making of a Graphic Novel

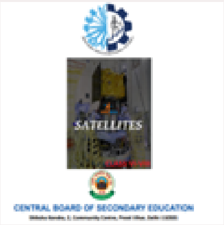


Kashmiri Embroidery

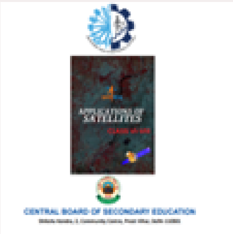
Embroidery



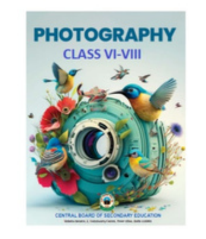
Rockets



Satellites

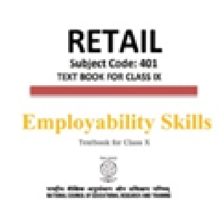


Application of Satellites

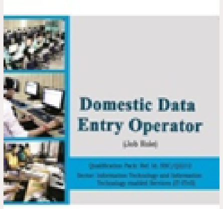


Photography

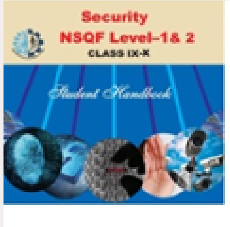
SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)



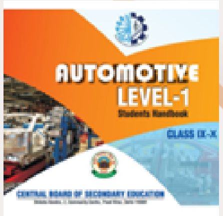
Retail



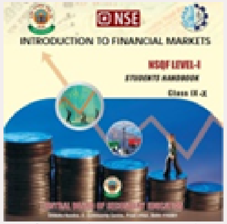
Information Technology



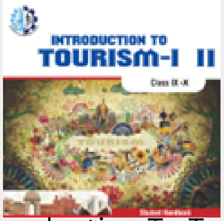
Security



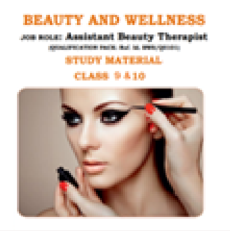
Automotive



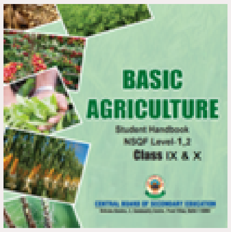
Introduction To Financial Markets



Introduction To Tourism

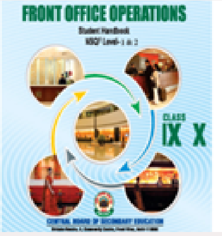


Beauty & Wellness



Agriculture

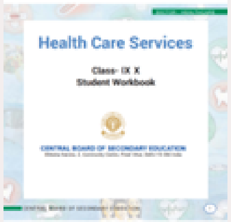
Food Production



Front Office Operations

Banking & Insurance

Marketing & Sales



Health Care

Apparel

STUDY MATERIAL
MEDIA (415)
CLASS - IX & X
Media & Entertainment Skills Council
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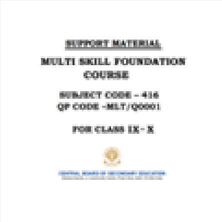
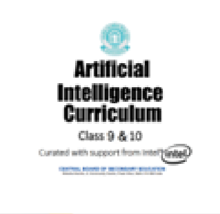
Multi Media



Multi Skill Foundation Course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Intelligence
Curriculum
Class 9 & 10
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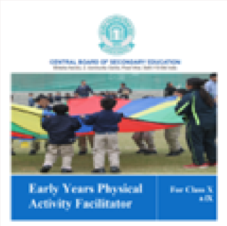
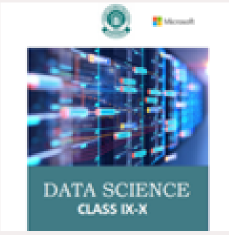
Artificial Intelligence



Physical Activity Trainer

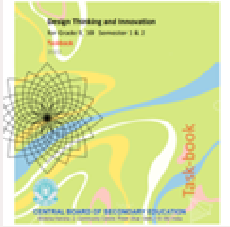


Data Science

CENTRAL BOARD OF SECONDARY EDUCATION
JOB ROLE: FIELD TECHNICIAN - OTHER HOME APPLIANCES
STUDENT TEXTBOOK
CLASS 9 & 10
Sector: ELECTRONICS AND HARDWARE

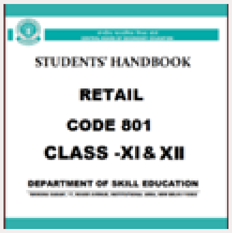
Electronics & Hardware (NEW)

Foundation Skills For Sciences (Pharmaceutical & Biotechnology)(NEW)

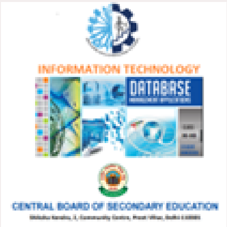

Design Thinking and Innovation
Task book
CENTRAL BOARD OF SECONDARY EDUCATION

Design Thinking & Innovation (NEW)

SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)


STUDENTS' HANDBOOK
RETAIL
CODE 801
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Retail


INFORMATION TECHNOLOGY
DATABASE
CENTRAL BOARD OF SECONDARY EDUCATION

InformationTechnology

Web Applications
Students Handbook
CLASS
XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

Web Application

AUTOMOTIVE
CLASS XI-XII
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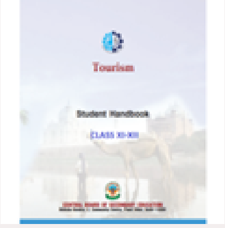
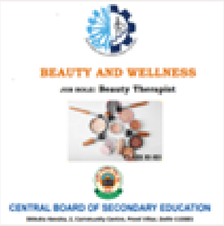
Automotive

FINANCIAL MARKETS MANAGEMENT
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

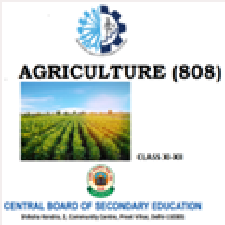
Financial Markets Management


Tourism
Student Handbook
CLASS XI-XII

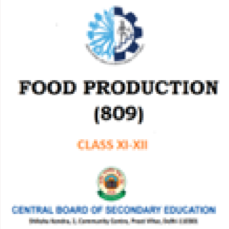
Tourism


BEAUTY AND WELLNESS
JOB ROLE: Beauty Therapist
CENTRAL BOARD OF SECONDARY EDUCATION

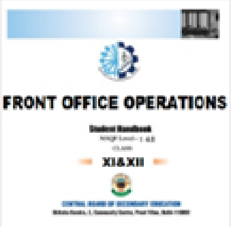
Beauty & Wellness


AGRICULTURE (808)
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

Agriculture


FOOD PRODUCTION
(809)
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

Food Production


FRONT OFFICE OPERATIONS
Student Handbook
XI&XII

Front Office Operations

BANKING
Student Handbook
XI&XII

Banking

MARKETING
Student Handbook
XI&XII

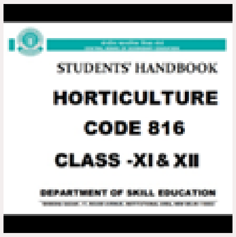
Marketing

SECTOR : HEALTHCARE
Student Workbook
CLASS XI&XII
Central Board of Secondary Education

Health Care

INSURANCE
Student Handbook
XI&XII

Insurance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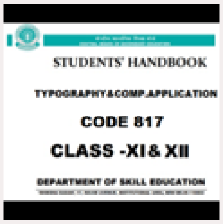
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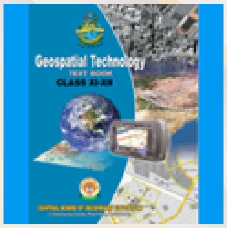
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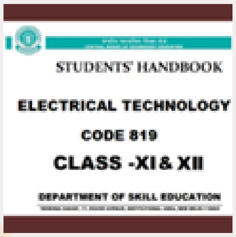
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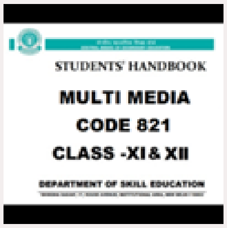
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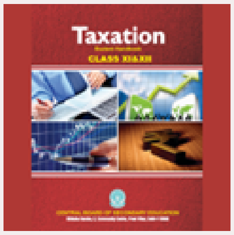
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Taxation

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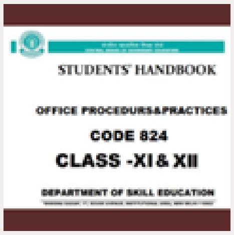
Cost Accounting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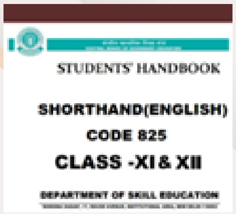
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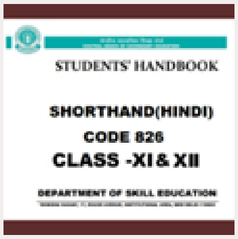
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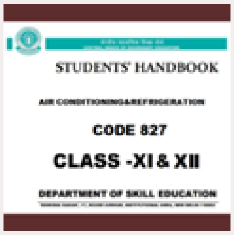
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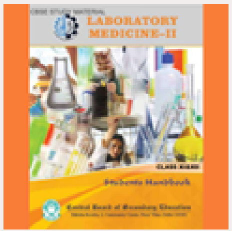
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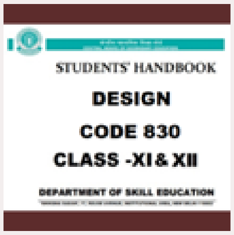
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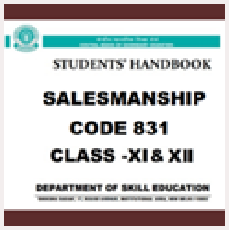
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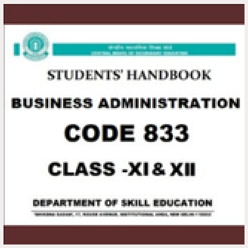
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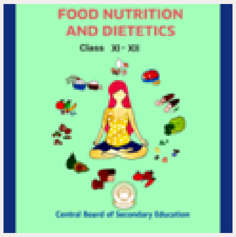
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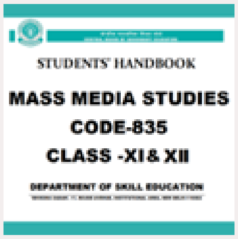
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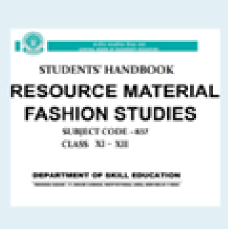
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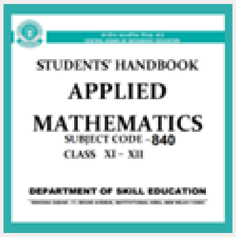
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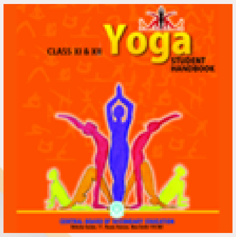
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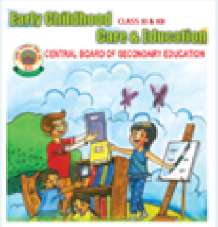
Yoga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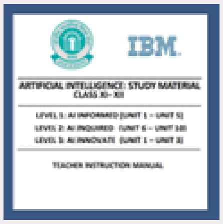
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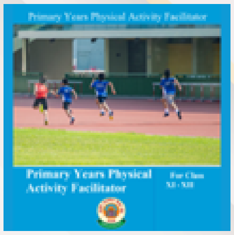
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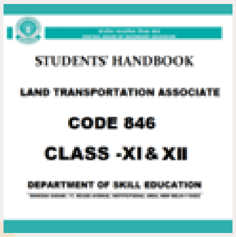
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